WHAT IS CLAIMED IS:

1. A STI forming method for improving STI step uniformity in a semiconductor device, said method comprising the steps of:

providing a substrate;

forming a pad oxide layer on said substrate;

forming a pad nitride layer on said substrate, so as to constitute an intermediate structure including the substrate, pad oxide layer and pad nitride layer;

forming shallow trench isolations in said intermediate structure;

forming an oxide layer on the whole structure, the shallow trench isolations being filled with said oxide layer;

forming a planarization material layer on said oxide layer;

performing planarization process to remove said planarization material layer and planarize the top surfaces of said oxide layer and said pad nitride layer.

2. The method as claimed in Claim 1, wherein the planarization material layer comprises BPSG.

3. The method as claimed in Claim 2, further comprising a step of heating the planarization material layer so that said planarization material layer reflows, after the step of forming the planarization material layer.

4. The method as Claimed in Claim 1, wherein the planarization material layer comprises anti-reflective material.

5. The method as Claimed in Claim 1, wherein the planarization process comprises CMP.

6. The method as Claimed in Claim 1, wherein the pad nitride layer comprises silicon nitride.